

An outbreak of rubella in British troops in Bosnia

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SUMMARY

An outbreak of rubella in April 1996 involved four male British soldiers deployed to Bosnia–Herzegovina. All were helicopter ground crew who were members of the same unit and who periodically travelled to and worked at forward air refuelling stations in Bosnia. There was a potential for spread of the infection to adjacent British units, to troops of other nations in the peacekeeping force, and also to the local civilian population. The British force included 620 female personnel, some of whom may have been non-immune to rubella. One pregnant British servicewoman was repatriated to UK for her own protection. There was a potential health risk, including the possibility of congenital rubella syndrome, in the non-immune wives and partners of deployed male personnel, as a result of contact during the mid-tour home leave of the husbands or partners. The outbreak was monitored through a medical surveillance system known as ARRC 97, and was contained by prompt and rigorous control measures. This outbreak shows the importance of effective surveillance and of good microbiology laboratory support during military operations. The role of immunization against rubella during future military deployments is discussed.

INTRODUCTION

The Dayton Peace Agreement signed on 15 December 1995 ended a 4-year civil war in Bosnia–Herzegovina and established a peacekeeping mandate for the Bosnian Peace Implementation Force (Ifor), commanded by NATO.

Britain undertook to contribute in excess of 10000 troops to Ifor, and during December and January 1995–6 some 5000 personnel were deployed rapidly into Bosnia. These augmented the existing British force of 6000 personnel, previously under UN command. There were 620 females in the British Ifor

contingent. The standard tour length for British Army personnel was 6 months, with a 2-week period of home leave at approximately the mid-tour point.

Figure 1 shows the principal troop locations in the British-led Ifor formation, known as Multinational Division Southwest. Military transport around the division was by road and helicopter, with daily air shuttles operated both by the Royal Air Force and by 9 Regiment Army Air Corps (9 Regt AAC). Forward Refuelling Points (FRPs) were established at Bosanski Petrovac, Sanski Most and Kiseljak. Each FRP was manned by a six-person ground crew team from 9 Regt AAC. The main base for the teams was at Split, and individual team members ‘rotated’ for 2 weeks at a time through one or other of the FRPs.

On 4 April 1996 a 25-year old air trooper from 9

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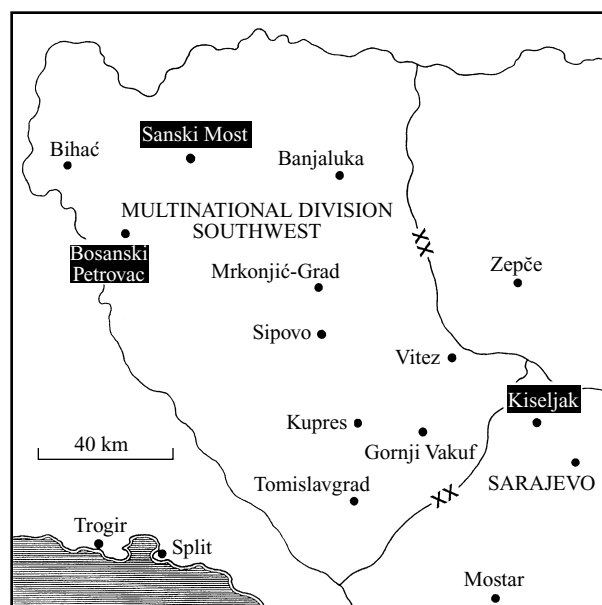


Fig. 1. Main British troop locations in Bosnia–Herzegovina in April 1996. Multinational Division Southwest is the British-controlled Ifor division. The Forward Refuelling Points (FRPs) are highlighted.

Regt AAC presented at the Medical Centre, Divulje Barracks, with conjunctivitis and a maculopapular rash which had erupted over his head and shoulders the previous day. On examination he was found to have postauricular and posterior cervical lymphadenopathy. The soldier had deployed from UK on 15 March and had been in contact with a case of rubella immediately prior to deployment. On 16 March he had travelled to the FRP at Sanski Most and remained there for 15 days, living in a six-man tent with five colleagues from 9 Regt AAC. He returned to Split on 1 April. During the latter half of his stay at Sanski Most he had experienced malaise and a dry throat. A presumptive diagnosis of rubella was made, and the patient was isolated for 4 days. A serum sample taken on the eighth day after the onset of his rash proved positive for rubella IgM antibodies. The sample, like all others tested during this outbreak, was assayed at the Franco–German field hospital in Trogir. An ELISA method was used.

From the medical press it was known that there was a seasonal epidemic of rubella in the UK at exactly this time [1]. Most cases in Britain in the early months of 1996 had occurred in males aged 15–34 years, in whom it was reported that the level of rubella susceptibility was 10–15% [2]. The age range of this cohort corresponded closely to the age structure of the British contingent deployed in Bosnia.

MATERIALS AND METHODS

Case finding

Because of the specialized nature of their work, ground crew from 9 Regt AAC deployed to Bosnia formed a relatively closed community. At each FRP the aircrew typically lived in a single cramped tent or room, and had little work or social contact with the other military personnel at the same location.

It was anticipated that secondary cases would present first of all within 9 Regt AAC. Towards the end of his period of infectivity the index case had moved by road from the 6-man AAC tent at Sanski Most to an 18-man dormitory at Split, which again was occupied wholly by 9 Regt AAC troops. Taking into account the incubation period of the disease, the known movements of the index case, and the presumed 10–15% level of rubella susceptibility in the (predominantly male) at-risk population, it was predicted that two or three secondary cases would present in members of 9 Regt AAC on or after the weekend of 13–14 April. It was anticipated that third generation cases, possibly involving troops from other British units, would occur 2 weeks after that.

All British medical officers in Bosnia–Herzegovina were contacted by signal on 13 April, with instructions that they should maintain a high degree of clinical vigilance for rubella infection. Any suspected cases were to be reported in the free-text section of a daily medical surveillance system known as ARRC 97, which was in place in all British primary care facilities [3]. Medical officers were advised to isolate any patient presenting with a maculopapular rash, and to submit at least one serum specimen for determination of rubella IgM antibody levels.

One of the investigators (AC) visited all the FRPs and spoke to the medical officer at each location. Phlebotomy equipment for taking serum samples was issued. A4-sized information sheets were left at each FRP location, to be displayed primarily in the working and sleeping premises of 9 Regt AAC personnel, and encouraging them to report for a medical examination if they experienced any of the standard symptoms of German measles.

Health education

Once it became apparent that an outbreak was developing, personnel from 9 Regt AAC who were on the point of returning to UK for their mid-tour home

leave were advised of the potential hazard of rubella to their spouses or partners should they be pregnant, or be intending soon to become pregnant. It was suggested that if they were concerned about congenital rubella syndrome (CRS) they telephoned their wives/partners before flying to UK, and encouraged them to consult their family practitioners for serological determination of their immune status. Female members of 9 Regt AAC were all counselled separately, and were encouraged to present locally for immune status determination, if they were worried about contracting the infection.

Notification to public health authorities

The Communicable Disease Surveillance Centre (CDSC) at Colindale was informed of the presence of one confirmed case of rubella in the British Ifor contingent. Subsequent notifications to CDSC were made through the Armed Forces' Consultant in Communicable Disease Control.

The Community Epidemiologist in Split was notified by the investigators of the occurrence of one case of rubella at Divulje Barracks. So also were principal medical staff of other Ifor contingents. The two Ifor microbiology laboratories in western Bosnia, operated by the French and German defence forces respectively, were visited by one of the investigators (AC) and were asked to notify him of any serologically-confirmed case of acute rubella in any Ifor soldier.

RESULTS

Second case

The second case presented with a rash at Divulje Barracks Medical Centre on 15 April. He was a 32 year old soldier from 9 Regt AAC who was normally based in Split. He had been in fleeting contact with the index case on 2 April. He was isolated for 4 days and made an uneventful recovery. Rubella IgM antibody testing proved positive.

Third case

A 25 year old soldier from 9 Regt AAC presented with a maculopapular rash at the medical centre at Kiseljak on 19 April. Between 1–3 April he had been in Split, and had been in regular contact with the

index case. He was isolated in the British Army hospital in Sarajevo, and made an uneventful recovery. Rubella IgM antibody testing was positive.

Fourth case

A 24 year old soldier from 9 Regt AAC presented with a maculopapular rash at the medical centre at Bosanski Petrovac on 25 April. He had been in Split between 8–10 April and while there he had come into contact with the second case at a time when his colleague would have been incubating rubella and would have been infectious. This fourth case was isolated at Bosanski Petrovac and the diagnosis of acute rubella was confirmed by IgM serology. He was the only third generation case in this outbreak.

Pregnant servicewoman

In the midst of this small outbreak a female British soldier based at Divulje Barracks was confirmed as being pregnant. She was not a member of 9 Regt AAC, and had no symptoms or signs of rubella. Her rubella immune status, however, was unknown and could not be ascertained within less than 10 days. Because of the risk of CRS a clinical decision was taken to repatriate her to her base unit in Germany, where there were not known to be any incident cases of rubella at that time.

Containment of outbreak

In addition to the four confirmed rubella cases documented above, three British servicemen presented during this period in various parts of Bosnia with signs and symptoms suggestive of rubella infection. In all these cases, however, rubella IgM serology proved negative. In the 8 weeks following 25 April no further cases were reported through the ARRC 97 medical surveillance system, and there were no cases in non-British Ifor personnel. The rubella outbreak was declared to be over.

DISCUSSION

Immunization against rubella is with a single dose of live, attenuated rubella virus vaccine. This elicits a protective antibody response in around 95% of recipients, and in most individuals is expected to

confer lifelong immunity [4]. Nevertheless there are occasional well-documented reports of loss of immunity and reinfection with rubella virus [5–8]. There is one report of a German mother who failed to seroconvert despite repeated immunization prior to conception. She gave birth to a child with CRS after being infected by her husband, who had contracted the disease in his military unit [9].

The significance of an outbreak of rubella in a deployed military population is threefold. Although a minimally disabling infection in adults, rubella has been shown to spread rapidly in military communities, due to favourable contact patterns in barracks, shipboard and field environments. [10, 11]. A seroprevalence study carried out on Canadian military recruits in 1991 found that 11% were susceptible, and in the light of this survey a decision was taken to immunize all Canadian recruits with MMR vaccine during their basic training [12].

This small outbreak of rubella in British troops in Bosnia had the potential to spread very widely throughout the multinational force in the region, and could have had serious operational implications. The fact that this did not happen demonstrates the importance of good microbiology laboratory support during military operations, and the value of an effective system of medical surveillance [3]. It may also reflect the thoroughness of the public health control measures that were imposed at the very start of the outbreak, even though the isolation of rubella cases on admission may not be of major benefit in preventing transmission, because the greater part of the infectious period occurs before symptoms develop [13].

The large number of deployed British females was a complicating factor in this outbreak. This sub-group was judged to be at special risk and this generated a requirement for targeted health education. In most western defence forces an increasing proportion of the uniformed workforce is now female, the proportion of women in the British Army currently standing at 7% [14]. Women are now deployed to field military locations to an extent which would not have occurred even 10 years ago. However, with the exception of the Canadian defence forces, it is believed that the routine immunization of all personnel against rubella has not been adopted as standard policy in any western army. A comparison of immunization policies in 11 military contingents taking part in a UN peacekeeping mission during 1990 showed that none of the national immunization schedules included rubella [15].

The third and final lesson from this outbreak follows from the fact that the relatively new phenomenon of the peacekeeping or peace enforcement operation is typically based on individual duty tours of 6 months' duration, usually with a fortnight's home leave at or just before the mid-tour point. This makes it possible for soldiers returning home from a rubella epidemic focus to inadvertently infect their non-immune wives or partners at a time when the wives/partners could be in the first trimester of a pregnancy, and so be vulnerable to CRS [16, 17].

Rubella is a seasonal illness which in temperate regions occurs in epidemics in late winter and early spring [18]. Resurgences of rubella have occurred in England and Wales in 1990, 1993 and 1996 [1]. It can be predicted that the next rubella epidemic in England and Wales will occur in the early spring of 1999, and the one after that will occur 3 years later. The military and public health consequences of the British Army's rubella outbreak in Bosnia in the spring of 1996 could have been grave, but fortunately were kept to a minimum. Military planners who are responsible for mounting deployments in the years 1998–9 should consider one of two options in order to minimize the likely impact of rubella infection and potential CRS from deployed troops: immunize all women prior to deployment, or else prohibit home leave until at least the 4-month point. Alternatively, military planners could choose to act now by adopting the Canadian strategy of administering MMR vaccine to all recruits regardless of any history of previous vaccination [12].

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